Issues Tracking
• Issues requested at April PC/TEAC meeting
• Responses received
  – Administrative questions (TEAC meeting minutes)
  – Local planning discussion
  – Cost allocation (post projected cost allocations to the web)
• Issues tracking related to outstanding analytic questions / needs
2010 RTEP Sensitivity Analysis Methodology
• Analysis will focus on EHV facilities

• Studies will focus on long term impact
15 Year Calculations (existing method)

- Yearly Load Increase (MW) for each PJM Zone
  - Difference in Yearly Load Forecasts for each PJM Zone
- Area Load DFAX (p.u.) for each PJM Zone
  - Source = all PJM generation
  - Sink = load in each PJM zone
- Existing Demand Response and Energy Efficiency
  - Reflected in the Yearly Load Increase
15 Year Calculations (existing method)

- 15 Year Load (MW) Calculation including existing DR & EE
  - Calculated for years 6 through 15 for each PJM zone
• 15 Year Loading Multiplier
  – Calculated for years 6 through 15 for every facility
  – Scales the loading to include the impact of supplying additional load in a future year
### 15 Year Calculations (existing method)

- **Final 15 Year Loading (%)**
  - 15 year loading (MW) / Facility Rating
  - Calculated for years 6 through 15 for every facility

<table>
<thead>
<tr>
<th>5 Year AC Loading (MW)</th>
<th>15 Year Loading Adder (MW)</th>
<th>=</th>
<th>15 Year Loading (MW)</th>
</tr>
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<tbody>
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</tbody>
</table>
15 Year Calculations (Sensitivity Analysis Method)

- Source used for Sensitivity Scenario DFAX calculation
  - Three zones
    - Atlantic Offshore
    - Appalachian Mountains
    - Western
  - Buses selected from each zone for use in DFAX calculation
  - Participation factor for each zone calculated using existing interconnection queue data
15 Year Calculations (Sensitivity Analysis Method)

- Sink used for Sensitivity Scenario DFAX calculation
  - Scenario Dependant
    - Assume existing PJM generation remains
      - Sink = all PJM generation
    - Assume at-risk generation is displaced
      - Sink = at-risk generation
  - At-risk generation
    - Generation that has not cleared in recent RPM auctions
    - Generation in a carbon constrained world
    - Revenue adequacy at risk generation
      - MMU SOM report identified 11,250 MW of generation
    - Aging Generation
15 Year Calculations (Sensitivity Analysis Method)

- 15 Year Sensitivity Scenario Factor
  - Calculated for years 6 through 15 for each PJM zone
  - DFAX calculated by sourcing wind generation and sinking to at-risk generation
  - Sensitivity scenario magnitude calculated using state RPS requirements

\[
\text{Scenario Magnitude (MW) per state mandates} \times \text{Sensitivity Scenario DFAX (p.u.)} = \text{15 Year Sensitivity Scenario Factor (MW)}
\]
• Final Sensitivity 15 Year Loading (%)
  – Final loading (MW) / Facility Rating
  – Calculated for years 6 through 15 for every facility
• 15 Year Load (MW) including existing DR & EE and state DR & EE mandates
  – Calculated for years 6 through 15 for each PJM zone
1. Add renewable generation to meet RPS assuming existing PJM generation remains

2. Add renewable generation to meet RPS assuming RPS displaces at-risk generation

3. Add renewable generation to meet RPS + DR + EE mandates assuming RPS displaces at-risk generation

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Sensitivity</th>
<th>Source</th>
<th>Sink</th>
<th>Test</th>
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<tbody>
<tr>
<td>RPS Sensitivity 1</td>
<td>RPS</td>
<td>Renewable Generation</td>
<td>Existing PJM Generation</td>
<td>Generator Deliverability &amp; Load Deliverability</td>
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<tr>
<td>RPS Sensitivity 2</td>
<td>RPS</td>
<td>Renewable Generation</td>
<td>At-Risk Generation</td>
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</tr>
<tr>
<td>RPS Sensitivity 3</td>
<td>RPS + DR + EE</td>
<td>Renewable Generation</td>
<td>At-Risk Generation</td>
<td></td>
</tr>
</tbody>
</table>
Eddystone & Cromby Retirement Study Update* 

* Indicates updated information since March 2010 TEAC Meeting
• In December 2009 Exelon notified PJM of their intent to retire the Eddystone 1&2 units and the Cromby 1&2 units in the PECO Energy Transmission zone.

• Proposed deactivation date is May 31, 2011.

• PJM staff has been evaluating the impact of the proposed deactivation.

• The following slides include the recommended upgrades and the expected in-service date.
• Chichester 230/138 kV transformer / loss of Macdade – Ridley – Morton 230 kV line (220-46) + loss of Island Road – Eddystone 230 kV line (220-23)

• Recommended Solution: Add a second 230 / 138 kV transformer at Chichester. Add an inductor in series with the parallel transformers

• Estimated cost: $5.908 M

• Expected In-service: December 16, 2011
- Eddystone – Saville 138 kV line / loss of Macdade – Ridley – Morton 230 kV line (220-46) + loss of Island Road – Eddystone 230 kV line (220-23)
- Recommended Solution: Replace terminal equipment at Eddystone and Saville and replace underground section of the line
- Estimated Cost: $3.94 M
- Projected In-Service: May 27, 2011
• Jarrett – Whitpain 230 kV line / loss of North Wales – Hartman 230 kV line (220-71) + Basecase

• Recommended Solution: Replace terminal equipment at Whitpain and Jarrett

• Estimated Cost: $ 0.175 M

• Projected In-Service: May 27, 2011
• Jarrett – Heaton 230 kV line / loss of North Wales – Hartman 230 kV line (220-71) + Basecase

• Recommended Solution: Replace terminal equipment at Heaton and Jarrett substations

• Estimated cost: $ 0.525 M

• Expected In-Service: May 27, 2011
• Hartman – Warrington 230 kV line overload for the following contingencies
  – loss of Jarrett – Whitpain 230 kV line (220-52) + Basecase

• Recommended Solution: Replace terminal equipment at Warrington and Hartman

• Estimated Cost: $0.375 M

• Projected In-Service: May 27, 2011
• Linwood – Chichester ‘220-43’ 230 kV line / single contingency (‘220-39’) loss of Linwood – Chichester ‘220-39’ 230 kV line and Philips island generating units CT2, CT3, and ST
• Recommended Solution: Replace terminal equipment at Chichester
• Estimated Cost: $0.475 M
• Expected In-Service: May 27, 2011
Linwood – Chichester ‘220-39’ 230 kV line / single contingency (‘220-43’)) loss of Linwood – Chichester ‘220-43’ 230 kV line and Philips island generating units CT2, CT3, and ST

Recommended Solution: Replace terminal equipment at Chichester

Estimated Cost: $0.475 M

Expected In-Service: May 27, 2011
• Chichester – Saville 138 kV line overloaded for the following contingencies:
  – line fault with stuck breaker contingency (‘GRAYS275’) loss of Grays Ferry – Tunnel 230 kV line due to Grays Ferry stuck breaker ‘275’
  – bus contingency (‘PLYM138B’) loss of Plymouth Meeting 138 kV bus
  – single contingency (‘220-27B’) loss of Gays Ferry – Tunnel 230 kV line
  – Basecase for gen deliv test
  – loss of Macdade – Ridley – Morton 230 kV line (220-46) + loss of Island Road – Eddystone 230 kV line (220-23)

• Recommended Solution: Reconductor the line and upgrade terminal equipment
• Estimated cost: $ 8.5 M
• Expected in-service: December 31, 2012
- Tunnel – Parrish 230 kV line overloaded for the following contingencies
  - single contingency (‘PJM89_A’) loss of New Freedom – East Windsor 500 kV for gen deliv test
  - Basecase for gen deliv test
- Recommended Solution:
  Replace terminal equipment at Parrish
- Estimated Cost: $0.15 M
- Expected In-Service: May 27, 2011
• Plymouth Meeting – Bryn Mawr 138 kV line overload for the following contingencies:
  – bus contingency (‘CHI230B1’) loss of Chichester bus section 1
  – line fault with stuck breaker contingency (‘CHICH045’) loss of Chichester – Foulk 230 kV line and Foulk 230/13.8 kV transformer #2 as well as Chichester bus section 1 due to the Chichester stuck breaker ‘045’
  – loss of Chichester 230/138 kV transformer (CHICH-T9) + Basecase
  – loss of Chichester 230/138 kV transformer (CHICH-T9) + Eddystone – Master 138 kV line (130-43)
  – line fault with stuck breaker contingency (‘CHICH785’) loss of the Chichester 230/138 kV transformer and Chichester 138/69 kV transformers #7 & 8

• Recommended solution: Install 230/138 kV transformer at Eddystone
• Estimated cost: $3.6 M
• Expected in-service: June 1, 2011
• North Wales and Heaton 138 kV area low voltage violations for the following contingencies
  – bus contingency (‘HEAT138B’) loss of Heaton 138 kV station bus section 2
  – line fault with stuck breaker contingency (‘HEAT0805’) loss of Heaton – Woodbourne 230 kV line with stuck breaker 805
  – line fault with stuck breaker contingency (‘HEAT0995’) loss of Heaton – Woodbourne 230 kV line with stuck breaker 995

• Recommended Solution: Add a second 230/138 kV transformer at Heaton. Add a circuit breaker on the Heaton – North Wales 138 kV line. Add a 35 MVAR capacitor at Heaton

• Estimated cost: $7.754 M

• Expected in-service: December 16, 2011
• Cromby 138 kV station low voltage violations for the following contingencies:
  – bus contingency (‘HEAT138B’) loss of Heaton 138 kV station bus section 2
  – line fault with stuck breaker contingency (‘HEAT0805’) loss of Heaton – Woodbourne 230 kV line with stuck breaker 805
  – line fault with stuck breaker contingency (‘HEAT0995’) loss of Heaton – Woodbourne 230 kV line with stuck breaker 995

• Recommended Solution:
  Replace 230/69 kV transformer #6 at Cromby. Add two 50 MVAR 230 kV capacitor banks at Cromby

• Estimated Cost: $6.142 M

• Projected in-service: December 31, 2011
• Perkiomen 138 kV station voltage violations for the following contingencies:
  – bus contingency (‘HEAT138B’) loss of Heaton 138 kV station bus section 2
  – line fault with stuck breaker contingency (‘HEAT0805’) loss of Heaton – Woodbourne 230 kV line with stuck breaker 805
  – line fault with stuck breaker contingency (‘HEAT0995’) loss of Heaton – Woodbourne 230 kV line with stuck breaker 995
• Recommended Solution: Add 138 kV circuit breakers at Cromby, Perkiomen, and North Wales. Add a 35 MVAR 138 kV capacitor at Perkiomen
• Estimated Cost: $ 3.9 M
• Expected In-Service: August 1, 2011
• Eddystone 230 kV CB #365
  – Recommended solution: Upgrade the circuit breaker
  – Estimated Cost: $0.125 M
  – Expected In-Service: May 31, 2011

• Eddystone 230 kV CB #785
  – Recommended solution: Upgrade the circuit breaker
  – Estimated Cost: $0.125 M
  – Expected In-Service: May 31, 2011
• Eddystone 230 kV CB #35
  – Recommended solution: Upgrade / replace the circuit breaker
  – Estimated Cost: TBD
  – Expected In-Service: May 27, 2011

• Eddystone 230 kV CB #45
  – Recommended solution: Upgrade the circuit breaker
  – Estimated Cost: TBD
  – Expected In-Service: May 27, 2011

• Note: Both of these circuit breakers are Exelon Power circuit breakers
• As noted on the previous slides a number of upgrades are not expected to be placed in-service until after the requested deactivation date

• PJM notified Exelon Power that Cromby #2 is needed for reliability until December 31, 2011 and Eddystone #2 is needed for reliability until December 31, 2012
Baseline Reliability Update – Potential Reliability Violations
• 2015 Load Deliverability Voltage and Load Deliverability Thermal Testing
  – Several areas have passed with no Potential reliability violations
    • AEP
    • Atlantic Electric
    • DPL
    • DPL South
    • Duquesne
    • Meted
    • Penelec
    • PECO
    • PPL
    • WMAAC

• 2015 Generator Deliverability and 2015 N-1-1 Thermal underway for all areas
• 2015 N-1-1 thermal is in-progress. Voltage will begin following the thermal testing.
- Several critical contingencies are non-covergent

  - Keystone - South Bend 500 kV
  - Conemaugh - Keystone 500 kV
  - Conemaugh - Jacks Mountain 500 kV
  - Keystone - Jacks Mountain 500 kV
  - Jacks Mountain - Juniata 1&2 500 kV
  - Conemaugh - Hunterstown 500 kV
  - Hunterstown - Conastone 500 kV
  - Conastone - Brighton 500 kV
  - Brighton - Doubs 500 kV
  - Calvert Cliffs - Waugh Chapel 500 kV
  - Burches Hill - Possum Point 500 kV
  - Brister - Ox 500 kV
  - Elmont - Cunningham 500 kV
  - Elmont - Ladysmith 500 kV
  - Ladysmith - Possum Point 500 kV
  - Loudoun - Morrisville 500 kV
  - Morrisville - North Anna 500 kV
  - Loudoun - Pleasant View 500 kV
  - Meadow Brook - Loudoun 500 kV
  - Mount storm - Meadow Brook 500 kV
  - Mount Storm - Greenland Gap 500 kV
  - Mount Storm - T157 Tap 500 kV
  - T157 Tap - Doubs 500 kV
  - Hatfield - Black Oak 500 kV
  - Hatfield - Ronco 500 kV
  - Hatfield - Banyan Run 500 kV
  - Bedington - Black Oak 500 kV
  - Bedington - Doubs 500 kV
  - Fort Martin - Ronco 500 kV
  - Yukon - South Bend 500 kV
  - Yukon - Banyan Run 500 kV
  - Cabot - Cranberry 500 kV
  - Cranberry - Wylie Ridge 500 kV
  - Calvert Cliffs 1&2 500 kV
  - P04 500 kV
  - Susquehanna #2
5% Voltage Drop at 2,870 MW transfer level

Steady State Stability Limit at 3,170 MW transfer level

Voltage Collapse at 3,460 MW transfer level

Loss of Black Oak - Bedington
MAAC Load Deliverability - Voltage

Loss of Black Oak - Bedington

5% Voltage Drop at 2,870 MW transfer level

Steady State Stability Limit at 3,170 MW transfer level

Voltage Collapse at 3,460 MW transfer level
• Several critical contingencies are non-convergent

- Red Lion to Hope Creek 500 kV
- New Freedom to East Windsor 500 kV
- Conemaug to Hunterstown 500 kV
- Hunterstown to Conastone 500 kV
- Susquehanna to Lackawanna 500 kV
- Lackawanna to Hopatcong 500 kV
- Hopatcong to Roseland 500 kV
- Keeney to Rock Springs 500 kV
- Rock Springs to Peach Bottom 500 kV
- Peach Bottom to Limerick 500 kV
- Alburtis to Branchburg 500 kV
- Smithburg to Deans 500 kV
- Keystone to Jacks Mt. 500 kV
- Branchburg to Elroy 500 kV
- Ford Mill 600 MW generator
- Ford Mill 600 MW generator
- Branchburg 400 MVAR capacitor
- Bergen 550 MW generator
- Linden 750 MW generator
Voltage Collapse at 6,900 MW transfer level
Loss of Rock Springs - Keeney

Voltage Collapse at 6,900 MW transfer level

CETO = 8,270 MW

Steady State Stability Limit
Voltage Drop Violation
Voltage Collapse
- Potential generator deliverability violations
- Tristate – Kenova 138 kV line overload for the loss of the Baker 765/345 kV transformer
- Kenova – South Point 138 kV line overload for the loss of the Baker 765/345 kV transformer
- Tristate – West Huntington 138 kV line overload the loss of the Baker 765/345 kV transformer
• Potential common mode outage violations
• Broadford - Smyth 138 kV line overload for the stuck breaker contingency with the loss of the Jackson Ferry – Cloverdale 765 kV line and Jackson Ferry 765/138 kV transformer #2, or for the stuck breaker contingency with the loss of the Jackson Ferry – Broadford 765 kV line and Jackson Ferry 765/138 kV transformer #2
• Smyth - Atkins 138 kV line overload for the stuck breaker contingency with the loss of the Jackson Ferry – Cloverdale 765 kV line and Jackson Ferry 765/138 kV transformer #2
• Atkins– Rural Retreat 138 kV line overload for the stuck breaker contingency with the loss of the Jackson Ferry – Cloverdale 765 kV line and Jackson Ferry 765/138 kV transformer #2
• Potential common mode outage violations
• Otter – Johnson Mountain – New - London 138 kV line overload for several contingencies
- Potential common mode outage violations
- Wolf Hill – North Bristol 138 kV line overload for several contingencies
- Elk Garden - Saltville 138 kV line overload for several contingencies
- Clinch River - Lebanon 138 kV line overload for several contingencies
- Clinch River - Clinchfield 138 kV line overload for the loss of the Clinch River – Freemont 138 kV line
• Potential common mode outage violations
• West Bellaire – Tidd 345 kV line overload for the line with stuck breaker contingency with loss of Kammer – South Canton 765 kV line, Kammer 765/500 kV transformer, South Canton 765/345 transformer #3, 502 Junction – Kammer 500 kV line and the South Canton 345/138 kV transformer
• Potential common mode outage violations
  • Rutland – Meigs Mine 138 kV line overload for the loss of Muskingum - Waterford 345 kV line or further loss Muskingum unit #2
  • Meigs Mine - Dexter 138 kV line overload for the loss of Muskingum - Waterford 345 kV line or further loss Muskingum unit #2
  • SOLIDA – Bellefonte 138 kV line overload for the loss of the North Proctorville – SOLIDA 138 kV line
• Potential generator deliverability violations
• Dexter – Elliot 138 kV line overload for the loss of Muskingum – Waterford 345 kV line
• Waterford – Muskingum River 345 kV line overload for the non-contingency condition
• Muskingum River 345/138 kV transformer overload for several contingencies
• Potential generator deliverability violations
• Tiltonsville – Windsor 138 kV line overload for several contingencies
- Potential generator deliverability violations
- Sterling – East Side 138 kV line overload for several contingencies
• Potential common mode outage violation
• Corner – Washington 138 kV line overload for the common tower outage of the Belmont – Trissler 138 kV line #1 and the Belmont – Edgelawn 138 kV line
• Ross – S Delano 138 kV line overload for several contingencies
• Circleville – Harrison 138 kV line overload for several contingencies
• Stroud Z – Stroud 138 kV line overload for the loss of the Dexter – Elliot - Poston 138 kV line
• Potential common mode outage violations
• S Delano - Delano 138 kV line overload for several contingencies
• Harris – Obetz 138 kV line overload for the line with stuck breaker contingency with the loss of Bixby – N Fork 345 kV line and Bixby 345/138 kV transformer #1 and #2
• Potential common mode outage violations
• Busseyville – Thelma 138 kV line overload for the line with stuck breaker contingency with the loss of Baker – Broadford 765 kV line and Baker 765/345 kV transformer
• Potential common mode outage violations
• Greentown 765/138 kV transformer overload for the line with stuck breaker contingency with the loss of the Dumont – Greentown 765 kV line and Greentown three winding transformer
• Potential common mode outage violations
• Grangston – Bellefonte 138 kV line overload for the loss of the Baker 765/345 kV transformer
• Potential common mode outage violations
• Lebanon – Elk Garden 138 kV line overload for the tower outage of the Dorton – Fremo 138 kV line and the Flemin – Dorton – Clinch River 138 kV line
• Potential common mode outage violations
• Reusen – Graves Mill 138 kV line overload for the tower outage of the E. Lynchburg – Joshua 138 kV line and the Joshua – Opossum Creek 138 kV line
- Potential common mode outage violations
- Smith Mountain – Candlers Mountain 138 kV line overload for several contingencies
- Matt Funk – Hancock 138 kV line overload for the line with stuck break contingency with the loss of Cloverdale – Jacksons Ferry 765 kV line, Cloverdale - Joshua 765 kV line, Cloverdale 765/345 kV transformer and Cloverdale – matt Funk 345 kV line
• Potential generator deliverability violations
• For the common mode outage test the Nipetown - Reid 138 kV line is overloaded for the fault of the Marlowe - Harmony Junction 138 kV line with a breaker failure at Marlowe
• Potential Recommended Solution: Reconductor Nipetown - Reid with 1033 ACCR 54/19
• Expected In-Service Date: 06/01/2015
• Potential generator deliverability violations
• Common mode outage violation on Corner - Washington 138 kV line is overloaded for the tower outage of the Belmont – Trissler 138 kV line #1 and the Belmont – Edgelawn 138 kV line
• Potential Recommended Solution: Upgrade Terminal Equipment at Washington 138kV
• Expected In-Service Date: 06/01/2015
- Potential generator deliverability violations
- For the common mode outage test the Ridgeway – Paper City 138 kV line is overloaded for the tower outage of the Elko 230 kV #4 Breaker Failure - Tie Breaker
- Potential Recommended Solution: Replace Structures between Ridgeway and Paper City
- Estimated In-Service Date: 06/01/2015
• Potential generator deliverability violations

• Common mode outage violation on the N47 Tap – Black Oak 138 kV line is overloaded for the Black Oak – Hatfield 500 kV line fault with stuck breaker Black Oak #4 or Black Oak500 #5

• Potential Recommended Solution: Reconductor the Albright - Black Oak 138 kV line with 795 ACSS

• Expected In-Service Date : 06/01/2015
• Potential generator deliverability violations
• For the generator deliverability test the Double Tollgate - Greenwood 138 kV line is overloaded for the loss of the Meadow Brook – West Winchester 138 kV line
• Potential Recommended Solution: Reconductor Double Toll Gate - Greenwood 138 kV with 954 ACSR conductor
• Expected In-Service Date: 06/01/2013
• Potential Common Mode Outage violations
• The Graceton – Bagley – Raphael 230 kV circuit is overloaded for the Conastone to North West 230 kV tower line outage
• The Conastone – North West 230 kV circuit (2322) is overloaded for the Brighton – Conastone, Brighton – Doubs 500 kV tower line outage
• The High Ridge – Columbia 230 kV circuit (2312) is overloaded for the Conastone to North West 230 kV tower line outage
• Potential Generation Deliverability violation
• The Sandy Spring – High Ridge 230 kV circuit (2334) is overloaded for loss of the Sandy Spring to Burtonsville 230 kV circuit (2314)
• The Sandy Spring – High Ridge 230 kV circuit (2314) is overloaded for loss of the Sandy Spring to Burtonsville 230 kV circuit (2334)
- Potential common mode outage violations
- Taylor – West Loop 345 kV Blue line is overloaded for the common tower contingency with loss of the line #1311 and line #1312
- Lisle Blue 345/138 kV transformer is overloaded for several contingencies
- Potential generator deliverability violation
- Garfield – Taylor 345 kV red is overloaded for the normal system condition
- East Frankfort – Goodings Grove 345 kV red is overloaded for the normal system condition
- Potential voltage violation for the common mode outage test
- The Gordonsville 230/115 kV Transformer #1 overloads for the outage of transformer #2
- A line fault with stuck breaker at Remington 230 kV causes low voltage magnitude violations in the Brandy - Culpeper - Mitchell 115 kV area
• Potential voltage violation for the common mode outage test

• A bus fault at Dooms 115 kV results in low voltage magnitude violations in the Midway - Red Hill - Sherwood 115 kV area
• Potential generator deliverability violation
• The Endless Caverns 230/115 kV transformer overloads for the outage of the Grottoes 230/115 kV transformer
• Potential Common Mode Outage violation
• The Raritian River – Deep Run 115 kV ‘B’ and ‘C’ circuits are overloaded for a line fault stuck breaker contingency that outages the Smithburg – Atlantic and Smithburg – Englishtown 230 kV circuits
- Potential Load Deliverability violation
- JCPL zonal load deliverability analysis shows voltage collapse violations for several contingencies in JCPL area
• Potential Generation Deliverability violation
• The Croydon – Burlington 230 kV circuit is overloaded for several contingencies
• Potential Generation Deliverability violation
• The Conowingo – Colora Tap 230 kV circuit is overloaded for the loss of the Conowingo – Nottingham 230 kV circuit
• Potential Generation Deliverability violation
• The Shade Gap – Roxbury 115 kV circuit is overloaded for several contingencies
• Potential Common Mode Outage violation
• The Warren – Falconer 115 kV circuit is overloaded for the Glade – Forest, Glade – Lewis Run 230 kV tower line outage
- Potential Generation Deliverability violation
- The Croydon – Burlington 230 kV circuit is overloaded for several contingencies
- The Gloucester – Cuthbert 230 kV circuit is overloaded for several contingencies
- Cuthbert – Camden 230 kV circuit is overloaded for several contingencies
- Eagle Point – Gloucester 230 kV is overloaded for several contingencies
• Potential Load Deliverability violation
• PSEG and PS North Zonal load Deliverability
• The Roseland – Cedar Grove – Clifton 230 kV ‘B’ and circuit is overload for the loss of the Roseland – Cedar Grove – Clifton 230 kV ‘F” circuit
• The Roseland – Cedar Grove – Clifton 230 kV and ‘F’ circuit is overload for the loss of the Roseland – Cedar Grove – Clifton 230 kV ‘B” circuit
• Voltage collapse violations for few 500 kV contingencies for PSEG load deliverability
Baseline Reliability Update
For the common mode outage test the Lemonyne – Maclean 138 kV circuit is overloaded for breaker failure operation of Bayshore 138 kV BK-JL Breaker

- Recommended Solution: Reconduct the Lemonyne – Maclean with 954 ACSS conductor (B1190)
- Estimated Cost: $4.3M
- Expected In-Service Date: 06/01/2013
• For the common mode outage test the Shenango – Crossland 138 kV circuit #2 is overloaded for breaker failure operation of Shenango 138 kV BK-18 Breaker

• Recommended Solution: Replace the meter at Crossland with a higher rated meter (B1191)

• Estimated Cost: $0.015M

• Expected In-Service Date: 06/01/2013
• For the common mode outage test the Bayshore – Chevy 138 kV circuit is overloaded for breaker failure operation of the Bayshore 138 kV BK-3K, BK-13254, BK-13256, BUS-K, BK-13252 or BK-KM breakers

• Recommended Solution: Reconductor Bayshore – Chevy 138 kV with 636 ACSS conductor (B1192)

• Estimated Cost: $4.3M

• Expected In-Service Date: 06/01/2013
• For the common mode outage test the Hanna – East Akron 138 kV circuit is overloaded for breaker failure operation of West Ravenna 138 kV BK-15K and the tower outage of the Hanna – West Ravenna #1 and the Hanna – West Ravenna #2 138 kV lines

• Recommended Solution: Replace the 800 Amp wavetrap at East Akron with a 1200 Amp wavetrap (B1193)

• Estimated Cost: $0.052M

• Expected In-Service Date: 06/01/2013
• For the common mode outage test the General Mills – Jackman 138 kV circuit is overloaded for the breaker failure operation of the Bayshore 138 kV BK-13254, BK-13256, BK-13252, BUS-K, or BK-KM breakers

• Recommended Solution: Reconductor General Mills – Jackman 138 kV with 636 ACSS conductor (B1194)

• Estimated Cost: $0.647M

• Expected In-Service Date: 06/01/2013
For Dominion and PEPCO Load Deliverability the Pleasant View 500/230 kV transformer is overloaded for the outage of Doubs to Brighton 500 kV and one Loudoun 500/230 kV transformer overloads for the outage of the parallel transformer.

- Recommended Solution: Install Brambleton 500/230 kV transformer and associated breakers.
- Estimated cost: $18 M
- Expected In-service: 06/01/2014
• For Dominion Load Deliverability the Clover 500/230 kV transformer is overloaded for the outage of the Carson to Wake 500 kV line along with low voltages in the Clover area

• Recommended Solution: Install 2nd Clover 500/230 kV transformer and a 150 MVar capacitor

• Estimated cost: $16 M

• Expected In-service: 06/01/2015
Review Issues Tracking
• Alternative Analysis
  – Combinations of alternatives, transmission, and reactive upgrades

• Interim TEAC meeting to discuss progress
  – Week of Wednesday, May 26th?